



Mechanisms of Ageing and Development  
123 (2002) 1695–1709

**mechanisms of ageing  
and development**

[www.elsevier.com/locate/mechagedev](http://www.elsevier.com/locate/mechagedev)

## Contents of volume 123

Volume 123 No. 1

December 2001

### Special Issue

6<sup>th</sup> Conference of Neurodegenerative Disorders:

Common Molecular Mechanisms

Tobago, West Indies

### Guest Editor

M.A. Smith

<b>Foreword</b> . . . . .	1
<b>Regular articles</b>	
Neurons in Alzheimer disease emerge from senescence A.K. Raina, P. Pardo, C.A. Rottkamp, X. Zhu, O.M. Pereira-Smith, M.A. Smith (Cleveland, OH; Houston, TX) . . . . .	3
Altered subcellular distribution of transcriptional regulators in response to A $\beta$ peptide and during Alzheimer's disease K. Jordan-Sciutto, J. Rhodes, R. Bowser (Pittsburgh, PA) . . . . .	11
Co-culture with astrocytes or microglia protects metabolically impaired neurons L.C.H. Park, H. Zhang, G.E. Gibson (White Plains, NY) . . . . .	21
Lack of association between human longevity and polymorphisms of IL-1 cluster, IL-6, IL-10 and TNF- $\alpha$ genes in Finnish nonagenarians X.-Y. Wang, M. Hurme, M. Jylhä, A. Hervonen (Tampere, Finland) . . . . .	29
Differential activation of neuronal ERK, JNK/SAPK and p38 in Alzheimer disease: the 'two hit' hypothesis X. Zhu, R.J. Castellani, A. Takeda, A. Nunomura, C.S. Atwood, G. Perry, M.A. Smith (Cleveland, OH; Sendai and Asahikawa, Japan) . . . . .	39
Glia-related pathomechanisms in Alzheimer's disease: a therapeutic target? P. Schubert, T. Ogata, C. Marchini, S. Ferroni (Martinsried, Germany; Ehime, Japan; Bologna, Italy) . . . . .	47
Instructions to Authors	59

## Volume 123 Nos. 2-3

January 2002

**Special Issue**

Genetic Effects on Aging III

Bar Harbor, ME, USA

**Guest Editors**

D.E. Harrison

J.W. Curtsinger

T.E. Johnson

<b>Preface</b> . . . . .	v
Keynote: mechanisms of senescence—complicationists versus simplificationists	
G.M. Martin (Seattle, WA) . . . . .	65
Commentary	
B.P. Braeckman, J.R. Vanfleteren (Ghent, Belgium) . . . . .	75
Commentary	
T.E. Johnson (Boulder, CO) . . . . .	77
Response to the Commentaries	
G.M. Martin (Seattle, WA) . . . . .	79
Lifespan, QTLs, age-specificity, and pleiotropy in <i>Drosophila</i>	
J.W. Curtsinger, A.A. Khazaeli (St. Paul, MN) . . . . .	81
The nature of quantitative genetic variation for <i>Drosophila</i> longevity	
T.F.C. Mackay (Raleigh, NC) . . . . .	95
Assaying metabolic activity in ageing <i>Caenorhabditis elegans</i>	
B.P. Braeckman, K. Houthoofd, A. De Vreese, J.R. Vanfleteren (Ghent, Belgium) . . . . .	105
The Snell dwarf mutation <i>Pit1<sup>dw</sup></i> can increase life span in mice	
K. Flurkey, J. Papaconstantinou, D.E. Harrison (Bar Harbor, ME; Galveston, TX) . . . . .	121
Optimizing detection of QTLs retarding aging: choice of statistical model and animal requirements	
S. Klebanov, D.E. Harrison (Bar Harbor, ME) . . . . .	131
A reduced peripheral blood CD4 <sup>+</sup> lymphocyte proportion is a consistent ageing phenotype	
J. Chen, K. Flurkey, D.E. Harrison (Bar Harbor, ME) . . . . .	145
Mitochondrial DNA mutation analysis in human skin fibroblasts from fetal, young, and old donors	
G.S. Gerhard, F.A. Benko, R.G. Allen, M. Tresini, A. Kalbach, V.J. Cristofalo, C.D. Gocke (Hershey, PA; Philadelphia, PA) . . . . .	155

Genetic differences in hepatic lipid peroxidation potential and iron levels in mice	
G.S. Gerhard, E.J. Kaufmann, X. Wang, K.M. Erikson, J. Abraham, M. Grundy, J.L. Beard, M.J. Chorney (Hershey, PA; Hanover, NH; University Park, PA). . . . .	167
Gene expression profiling of aging using DNA microarrays	
R. Weindruch, T. Kayo, C.-K. Lee, T.A. Prolla (Madison, WI) . . .	177
Searching for genetic determinants of human aging and longevity: opportunities and challenges	
J. Vijg, N. van Orsouw (San Antonio, TX). . . . .	195
Protein turnover plays a key role in aging	
A.G. Ryazanov, B.S. Nefsky (Piscataway, NJ). . . . .	207
Caloric restriction and lifespan: a role for protein turnover?	
N. Tavernarakis, M. Driscoll (New-Brunswick, NJ). . . . .	215
What does it take to live to 100?	
T. Perls, R. Levenson, M. Regan, A. Puca (Boston, MA; Indianapolis, IN). . . . .	231

**Volume 123 No. 4****February 2002****Reviews**

## Ageing and apoptosis

Y. Zhang, B. Herman (San Antonio, TX) . . . . .	245
---	-----

*Caenorhabditis elegans*—a paradigm for aging research: advantages and limitations

H. Gershon, D. Gershon (Haifa, Israel). . . . .	261
---	-----

**Regular articles**

## Aortic vasoreactivity during prolonged hypoxia and hypoxia–reoxygenation in senescent rats

S. Besse, S. Tanguy, F. Boucher, A.-L. Bulteau, B. Riou, J. de Leiris, B. Swynghedauw (Grenoble and Paris, France) . . . . .	275
--	-----

Loss of prohibitins, though it shortens the replicative life span of yeast cells undergoing division, does not shorten the chronological life span of G<sub>0</sub>-arrested cells

P.W. Piper, D. Bringloe (London, UK). . . . .	287
---	-----

## Effect of age and oxidative stress on tyrosine phosphorylation of ZAP-70

B. Chakravarti, G.N. Abraham (New York, NY). . . . .	297
--	-----

## Differential effects of ageing on cytokine and chemokine responses during type-1 (Mycobacterial) and type-2 (Schistosomal) pulmonary granulomatous inflammation in mice

B.C. Chiu, X. Shang, K.A. Frait, J.S. Hu, E. Komuniecki, R.A. Miller, S.W. Chensue (Ann Arbor, MI) . . . . .	313
--	-----

The action of aging upon coronary intima and renal microvasculature in USA and Andes populations R.E. Tracy, D. Parra, W. Eisaguirre, R.A. Torres Balanza (New Orleans, LA; La Paz, Bolivia; Juliaca, Peru) . . . . .	327
Age-related death-survival balance in myocardium: an immunohistochemical and biochemical study L. Centurione, A. Antonucci, S. Miscia, A. Grilli, M. Rapino, G. Grifone, V. Di Giacomo, C. Di Giulio, M. Falconi, A. Cataldi (Chieti and Bologna, Italy) . . . . .	341
Modelling telomere shortening and the role of oxidative stress C.J. Proctor, T.B.L. Kirkwood (Newcastle upon Tyne, UK). . . . .	351
The impact of catalase expression on the replicative lifespan of <i>Saccharomyces cerevisiae</i> S.M. Van Zanduycke, P.J. Sohler, K.A. Smart (Oxford, UK). . . . .	365
Age-related impairment of human T lymphocytes' activation: specific differences between CD4 <sup>+</sup> and CD8 <sup>+</sup> subsets K. Schindowski, L. Fröhlich, K. Maurer, W.E. Müller, A. Eckert (Frankfurt/Main, Germany). . . . .	375
Dietary restriction alters cell proliferation in rats: an immunohistochemical study by labeling proliferating cell nuclear antigen M.H. Lu, A. Warbritton, N. Tang, T.J. Bucci (Jefferson and Little Rock, AR) . . . . .	391
Alterations in thymopoiesis in intact and peripubertally orchidectomized adult rats of different age G. Leposavić, B. Pejčić-Karapetrović, D. Kosec (Belgrade, Yugoslavia) . . . . .	401
Reduced collagenolytic activity of matrix metalloproteinases and development of liver fibrosis in the aging rat N. Gagliano, B. Arosio, F. Grizzi, S. Masson, J. Tagliabue, N. Dioguardi, C. Vergani, G. Annoni (Milan, Italy) . . . . .	413
Cellular signaling, AGE accumulation and gene expression in hepatocytes of lean aging rats fed ad libitum or food-restricted L. Teillet, P. Ribière, S. Gouraud, H. Bakala, B. Corman (Paris and Gif-sur-Yvette, France) . . . . .	427
<b>Abstracts</b>	
Abstracts from The Annual Scientific Meeting of the British Society for Research on Ageing . . . . .	441



**Guest Editors**

R. Bortolami  
M.L. Lucchi  
F. Amenta  
D. Zaccheo

**Preface**

Neuromorphological aspects of development and aging

R. Bortolami, M.L. Lucchi, F. Amenta, D. Zaccheo (Ozzano dell' Emilia, Camerino and Genoa, Italy). . . . . 453

**Regular Articles**

Developmentally regulated expression and localization of dystrophin and utrophin in the human fetal brain

V. Sogos, M. Curto, C. Reali, F. Gremo (Cagliari, Italy) . . . . . 455

AMPA-type glutamate receptor subunits 2/3 in the human trigeminal sensory ganglion and subnucleus caudalis from prenatal ages to adulthood

M. Quartu, M. Pina Serra, R. Ambu, M. Letizia Lai, M. Del Fiacco (Cagliari, Italy) . . . . . 463

Development of dendritic bundles of pyramidal neurons in the rat visual cortex

R. Curtetti, D. Garbossa, A. Vercelli (Torino, Italy) . . . . . 473

Glial fibrillary acidic protein immunoreactive astrocytes in developing rat hippocampus

A. Catalani, M. Sabbatini, C. Consoli, C. Cinque, D. Tomassoni, E. Azmitia, L. Angelucci, F. Amenta (Rome and Camerino, Italy; New York, NY) . . . . . 481

Postnatal development of dopamine receptor expression in rat peripheral blood lymphocytes

D. Tomassoni, E. Bronzetti, F. Cantalamessa, F. Mignini, A. Ricci, M. Sabbatini, S.K. Tayebati, D. Zaccheo (Camerino, Rome and Genoa, Italy) . . . . . 491

Postnatal development of rat dentate gyrus: effects of methylazoxymethanol administration

S. Ciaroni, T. Cecchini, P. Ferri, P. Ambrogini, R. Cuppini, G. Lombardelli, G. Peruzzi, P. Del Grande (Urbino, Italy) . . . . . 499

Effect of growth factors on nuclear and mitochondrial ADP-ribosylation processes during astroglial cell development and aging in culture

V. Spina Purrello, G. Cormaci, L. Denaro, S. Reale, A. Costa, C. Lalicata, M. Sabbatini, B. Marchetti, R. Avola (Catania, Rome, Camerino and Sassari, Italy) . . . . . 511

Muscarinic cholinergic receptor subtypes in the hippocampus of aged rats

S. Khosrow Tayebati, F. Amenta, D. El-Assouad, D. Zaccheo (Camerino and Genoa, Italy) . . . . . 521

Cholinergic innervation of pial arteries in senescent rats: an immunohistochemical study	
D. El-Assouad, S. Khosrow Tayebati (Camerino, Italy) . . . . .	529
Age-related changes of dopamine receptor protein immunoreactivity in the rat mesenteric vascular tree	
A. Ricci, F. Amenta, E. Bronzetti, L. Felici, T. Hussain, M.F. Lokhandwala (Rome and Camerino, Italy; Houston, TX) . . . . .	537
The hippocampus in spontaneously hypertensive rats: an animal model of vascular dementia?	
M. Sabbatini, A. Catalani, C. Consoli, N. Marletta, D. Tomassoni, R. Avola (Camerino, Roma and Catania, Italy) . . . . .	547

**Volume 123 No. 6****31 March 2002****Editorials**

Apoptosis and successful aging	
Y. Zhang, B. Herman (San Antonio, TX) . . . . .	563
Between Scylla and Charybdis: p53 links tumor suppression and aging	
J. Campisi (Berkeley, CA). . . . .	567

**Regular Articles**

Murine leukemia virus in organs of senescence-prone and -resistant mouse strains	
R.I. Carp, H.C. Meeker, R. Chung, C.A. Kozak, M. Hosokawa, H. Fujisawa (Staten Island, NY; Bethesda, MD; Kyoto, Japan). . . . .	575
The telomeric length and heterogeneity decrease with age in normal human oral keratinocytes	
M.K. Kang, J. Swee, R.H. Kim, M.A. Baluda, N.-H. Park (Los Angeles, CA) . . . . .	585
Age differentially influences estrogen receptor- $\alpha$ (ER $\alpha$ ) and estrogen receptor- $\beta$ (ER $\beta$ ) gene expression in specific regions of the rat brain	
M.E. Wilson, K.L. Rosewell, M.L. Kashon, P.J. Shughrue, I. Merchenthaler, P.M. Wise (Lexington, KY; Radnor, PA) . . . . .	593
Effects of aging on hepatic IGF-I signaling	
C. Li, W.S. Parkhouse (Burnaby, BC, Canada) . . . . .	603
Enhanced apoptosis in prolonged cultures of senescent porcine pulmonary artery endothelial cells	
J. Zhang, J.M. Patel, E.R. Block (Gainesville, FL) . . . . .	613
Growth hormone influences the content and composition of collagen in the aorta from old rats	
A. Br��el, H. Oxlund (Aarhus, Denmark) . . . . .	627

New age patterns of survival improvement in Sweden: do they characterize changes in individual aging? A.I. Yashin, A.S. Begun, S.I. Boiko, S.V. Ukraintseva, J. Oeppen (Rostock, Germany; Durham, NC; Moscow, Russia; Cambridge, UK)	637
Activation of an adipogenic program in adult myoblasts with age J.M. Taylor-Jones, R.E. McGehee, T.A. Rando, B. Lecka-Czernik, D.A. Lipschitz, C.A. Peterson (Little Rock, AR; Stanford, CA) . . .	649
Enhancement of lipopolysaccharide-stimulated cyclooxygenase-2 mRNA expression and prostaglandin E <sub>2</sub> production in gingival fibroblasts from individuals with Down syndrome Y. Otsuka, M. Ito, M. Yamaguchi, S. Saito, K. Uesu, K. Kasai, Y. Abiko, J. Mega (Chiba, Japan). . . . .	663
Metallothioneins (I + II) and thyroid-thymus axis efficiency in old mice: role of corticosterone and zinc supply E. Mocchegiani, R. Giacconi, C. Cipriano, N. Gasparini, F. Orlando, R. Stecconi, M. Muzzioli, G. Isani, E. Carpenè (Ancona and Bologna, Italy). . . . .	675
Ageing is associated with a decrease in the number of sarcolemmal ATP-sensitive K <sup>+</sup> channels in a gender-dependent manner H.J. Ranki, R.M. Crawford, G.R. Budas, A. Jovanović (Dundee, Scotland, UK) . . . . .	695
The inhibition of calcium signaling in T lymphocytes from old mice results from enhanced activation of the mitochondrial permeability transition pore M.W. Mather, H. Rottenberg (Philadelphia, PA) . . . . .	707

**Volume 123 No. 7****April 2002****Special Issue**

The Biology of Ageing

**Guest Editor**

M.H. Goyns

**Preface**

The Biology of Ageing

M.H. Goyns (Sunderland, UK) . . . . . 727

**Introduction**

The social implications of an ageing population

A. Tinker (London, UK) . . . . . 729

**Regular articles**

Evolution of ageing

T.B.L. Kirkwood (Newcastle upon Tyne, UK). . . . . 737

Ageing in plants	
H. Thomas (Ceredigion, UK) . . . . .	747
Aging in fungi: role of mitochondria in <i>Podospora anserina</i>	
H.D. Osiewacz (Frankfurt am Main, Germany) . . . . .	755
Stress resistance as a determinate of <i>C. elegans</i> lifespan	
G.J. Lithgow, G.A. Walker (Novato, CA) . . . . .	765
The evolution of senescence in fish	
D. Reznick, C. Ghalambor, L. Nunney (Riverside, CA) . . . . .	773
Genes, telomeres and mammalian ageing	
M.H. Goyns (Sunderland, UK) . . . . .	791
Molecular mechanisms of skin ageing	
G. Jenkins (Bedford, UK) . . . . .	801
Ageing of the brain	
B.H. Anderton (London, UK) . . . . .	811

**Volume 123 No. 8****30 April 2002****Special Section****"Time, Cells and Strehler"**

Preface . . . . .	819
The life and contributions of Professor Bernard L. Strehler, founding Editor-in-Chief of <i>Mechanisms of Ageing and Development</i> , Professor of Biology at the University of Southern California (February 21, 1925– May 13, 2001)	
L.S. Coles (Marina del Rey, CA) . . . . .	821
Bernard Strehler: vivid recollections	
C.E. Finch (Los Angeles, CA) . . . . .	827
Bernard Strehler—inspiration for basic research into the mechanisms of ageing	
M.L. Katz (Columbia, MO) . . . . .	831
Advice to an aging scientist	
D.E.L. Promislow, S.D. Pletcher (Athens, GA; London, UK) . . . . .	841
Fixation of deleterious alleles, evolution and human aging	
G.A. Cortopassi (Davis, CA) . . . . .	851
Paradigms and pitfalls of yeast longevity research	
D.A. Sinclair (Boston MA) . . . . .	857
Long-lived mutants, the rate of aging, telomeres and the germline in <i>Caenorhabditis elegans</i>	
C. Bénard, S. Hekimi (Montreal, Canada) . . . . .	869
Cell signaling in aging and apoptosis	
Y. Suh (Seoul, South Korea) . . . . .	881



mtLOH (mitochondrial loss of heteroplasmy), aging, and 'surrogate self' E. Nekhaeva, Y. Kraytsberg, K. Khrapko (Boston, MA) . . . . .	891
<i>In memoriam</i> Bernard Strehler—genomic instability in ageing: a persistent challenge A. Bürkle (Newcastle upon Tyne, UK) . . . . .	899
Large genome rearrangements as a primary cause of aging J. Vijg, M.E.T. Dollé (San Antonio, TX) . . . . .	907
Functional recovery of senescent cells through restoration of receptor-me- diated endocytosis S.C. Park (Seoul, South Korea) . . . . .	917
Genetics of cellular senescence K. Tominaga, A. Olgun, J.R. Smith, O.M. Pereira-Smith (San Antonio, TX; Ankara, Turkey) . . . . .	927
Approach of evolutionary theories of ageing, stress, senescence-like pheno- types, calorie restriction and hormesis from the view point of far-from- equilibrium thermodynamics O. Toussaint, J. Remacle, J.-F. Dierick, T. Pascal, C. Fripiat, V. Royer, F. Chainiaux (Namur, Belgium) . . . . .	937
Brain evolution and lifespan regulation: conservation of signal transduc- tion pathways that regulate energy metabolism M.P. Mattson (Baltimore, MD) . . . . .	947
The frail elderly: role of dendritic cells in the susceptibility of infection K. Uyemura, S.C. Castle, T. Makinodan (Los Angeles, CA) . . . . .	955
Beneficial influences of systemic cooperation and sociological behavior on longevity J.D. Mountz, G.V. Zant, D.B. Allison, H.-G. Zhang, H.-C. Hsu (Birm- ingham, AL; Lexington, KY) . . . . .	963
Immunological memory and late onset autoimmunity S. Stacy, K.A. Krolick, A.J. Infante, E. Kraig (San Antonio, TX) . . . .	975
Human premature aging syndromes and genomic instability V.A. Bohr (Baltimore, MD) . . . . .	987
<b>Special Section</b>	
Interventions, Part III	
Proceedings of the Fifth International NILS Workshop on Longevity Sciences	
Editorial . . . . .	995
Bioavailability of elderberry anthocyanins P.E. Milbury, G. Cao, R.L. Prior, J. Blumberg (Boston, MA) . . . . .	997
Reactive oxygen and nitrogen species and cellular and organismal decline: amelioration with melatonin R.J. Reiter, D.-x. Tan, S. Burkhardt (San Antonio, TX) . . . . .	1007

Nitrones, their value as therapeutics and probes to understand aging R.A. Floyd, K. Hensley, M.J. Forster, J.A. Kelleher-Andersson, P.L. Wood (Oklahoma City, OK; Fort Worth, TX; Sunnyvale, CA) . . . . .	1021
Effect of red wine polyphenols on vascular smooth muscle cell function— molecular mechanism of the 'French paradox' K. Iijima, M. Yoshizumi, Y. Ouchi (Tokyo, Japan). . . . .	1033
Effects of antioxidants on kidney disease M. Mune, H. Otani, S. Yukawa (Wakayama, Japan). . . . .	1041
The pathogenesis of HIV-induced dementia E. Koutsilieris, C. Scheller, S. Sopper, V. ter Meulen, P. Riederer (Würzburg, Germany) . . . . .	1047
Animal models and possible human application of immunological restoration in the elderly K. Hirokawa, M. Utsuyama (Tokyo, Japan). . . . .	1055
Modulation of neuroendocrine-immune signaling by L-deprenyl and L-desmethyldeprenyl in aging and mammary cancer S. ThyagaRajan, D.L. Felten (Orange, CA) . . . . .	1065
Novel neuroprotective anti-Alzheimer drugs with anti-depressant activity derived from the anti-Parkinson drug, rasagiline M.B.H. Youdim, M. Weinstock (Haifa, Jerusalem, Israel) . . . . .	1081
Why (–)deprenyl prolongs survivals of experimental animals: Increase of anti-oxidant enzymes in brain and other body tissues as well as mobilization of various humoral factors may lead to systemic anti-aging effects K. Kitani, C. Minami, K.-i. Isobe, K. Maehara, S. Kanai, G.O. Ivy, M.-C. Carrillo (Aichi, Tokyo, Japan; Scarborough, Canada; Rosario, Argentina). . . . .	1087
Mechanism of action of anti-aging DHEA-S and the replacement of DHEA-S H. Nawata, T. Yanase, K. Goto, T. Okabe, K. Ashida (Fukuoka, Japan) . . . . .	1101
Dehydroepiandrosterone (DHEA) as a possible source for estrogen formation in bone cells: correlation between bone mineral density and serum DHEA-sulfate concentration in postmenopausal women, and the presence of aromatase to be enhanced by 1,25-dihydroxyvitamin D3 in human osteoblasts R. Takayanagi, K. Goto, S. Suzuki, S. Tanaka, S. Shimoda, H. Nawata (Fukuoka, Japan). . . . .	1107

## Regular Section

### Progress

AGEID: a database of aging genes and interventions M. Kaeberlein, B. Jegalian, M. McVey (Medford, MA; Cambridge, MA; Chapel Hill, NC). . . . .	1115
---	------

**Regular Articles**

- Dietary restriction reduces atherosclerosis and oxidative stress in the aorta of apolipoprotein E-deficient mice  
Z.M. Guo, F. Mitchell-Raymundo, H. Yang, Y. Ikeno, J. Nelson, V. Diaz, A. Richardson, R. Reddick (San Antonio, TX). . . . . 1121
- Identification of high caspase-3 mRNA expression as a unique signature profile for extremely old individuals  
C. Lacelle, S. Xu, E. Wang (Montreal, Canada; Louisville, KY) . . . . 1133
- Age-related change in thymic T-cell development is associated with genetic loci on mouse chromosomes 1, 3, and 11  
H.-C. Hsu, J.D. Mountz, R.W. Williams, B.J. Shelton, P.-A. Yang, Y. Matsuki, X. Xu, C.H. Dodd, L. Li, H. Geiger, H.-G. Zhang, G. Van Zant (Birmingham, AL; Memphis, TN; Lexington, KY) . . . . . 1145
- The 'intestinal-renal' arginine biosynthetic axis in the aging rat  
S.K. Mistry, Z. Greenfeld, S.M. Morris Jr., C. Baylis (Pittsburgh, PA; Morgantown, WV) . . . . . 1159
- Age-associated decrease in virus-specific CD8+ T lymphocytes during primary influenza infection  
J.L.Z. Po, E.M. Gardner, F. Anaraki, P.D. Katsikis, D.M. Murasko (Philadelphia, PA) . . . . . 1167
- Age-related changes of cholesterol and dolichol biosynthesis in rat liver  
M. Marino, V. Pallottini, C. D'Eramo, G. Cavallini, E. Bergamini, A. Trentalance (Rome, Pisa, Italy). . . . . 1183
- Effects of aging on hypothalamic-pituitary-adrenal system function in non-human primates  
N.D. Goncharova, B.A. Lapin (Sochi-Adler, Russia) . . . . . 1191

**Volume 123 No. 9****May 2002****Regular Articles**

- Rejuvenescence and extension of an urochordate life span following a single, acute administration of an anti-oxidant, butylated hydroxy-toluene  
A. Voskoboynik, A.Z. Reznick, B. Rinkevich (Haifa, Israel). . . . . 1203
- Age-dependent modulation of NF- $\kappa$ B expression in rat adrenal gland  
R. Medicherla, S. Leers-Sucheta, Y. Luo, S. Azhar (Palo Alto, CA) . . . . 1211
- Implications for the insulin signaling pathway in Snell dwarf mouse longevity: a similarity with the *C. elegans* longevity paradigm  
C.-C. Hsieh, J.H. DeFord, K. Flurkey, D.E. Harrison, J. Papaconstantinou (Galveston, TX; Bar Harbor, ME) . . . . . 1229
- Effects of the *Pit1* mutation on the insulin signaling pathway: implications on the longevity of the long-lived Snell dwarf mouse  
C.-C. Hsieh, J.H. DeFord, K. Flurkey, D.E. Harrison, J. Papaconstantinou (Galveston, TX; Bar Harbor, ME) . . . . . 1245

Age-dependent DNA methylation changes in the <i>ITGAL</i> (CD11a) promoter	
Z. Zhang, C. Deng, Q. Lu, B. Richardson (Ann Arbor, MI) . . . . .	1257
Plasma cystine concentration and redox state in aging and physical exercise	
W. Hildebrandt, R. Kinscherf, K. Hauer, E. Holm, W. Dröge (Heidelberg, Mannheim, Germany). . . . .	1269
Lower percentage of CD8 <sup>high</sup> +CD152 <sup>+</sup> but not CD8 <sup>high</sup> +CD28 <sup>+</sup> T lymphocytes in the elderly may be reverted by interleukin 2 in vitro	
P. Trzonkowski, J. Myśliwska, E. Szmit, M. Żak, J. Foerster, A. Myśliwski (Gdansk, Poland) . . . . .	1283

## Volume 123 No. 10

July 2002

## Regular Articles

Effects of 60% oxygen inhalation on the survival and antioxidant enzyme activities of young and old rats	
F. Gomi, M. Matsuo (Tokyo, Hyogo, Japan) . . . . .	1295
The ageing heart: influence of cellular and tissue ageing on total content and distribution of the variants of elongation factor-2	
D. Jäger, J. Holtz, N.T. Redpath, S.P. Müller, K. Pönicke, I. Heinroth-Hoffmann, K. Werdan, U. Müller-Werdan (Halle, Germany) . . . . .	1305
Osteoclastogenic potential of bone marrow cells increases with age in elderly women with fracture	
Y. Koshihara, A. Suematsu, D. Feng, R. Okawara, H. Ishibashi, S. Yamamoto (Tokyo, Japan) . . . . .	1321
Glutamate uptake in cultured astrocytes depends on age: a study about the effect of guanosine and the sensitivity to oxidative stress induced by H <sub>2</sub> O <sub>2</sub>	
C. Gottfried, F. Tramontina, D. Gonçalves, C.A. Gonçalves, E. Moriguchi, R.D. Dias, S.T. Wofchuk, D.O. Souza (Porto Alegre, Brazil) . . . . .	1333
Impairment of neural precursor proliferation increases survival of cell progeny in the adult rat dentate gyrus	
S. Ciaroni, T. Cecchini, P. Ferri, P. Ambrogini, R. Cuppini, M. Riccio, G. Lombardelli, S. Papa, P. Del Grande (Urbino, Bologna, Italy) . . . . .	1341
Growth hormone increases the total number of cardiac myocyte nuclei in young rats but not in old rats	
A. Brüel, H. Oxlund, J.R. Nyengaard (Aarhus, Denmark) . . . . .	1353
Down-regulation of mitochondrial cytochrome <i>c</i> oxidase in senescent porcine pulmonary artery endothelial cells	
J. Zhang, E.R. Block, J.M. Patel (Gainesville, FL) . . . . .	1363



Assessing effects of long-term food restriction on myocardial energetics in the isolated heart preparation S. Klebanov, J.T. Herlihy, G.L. Freeman (San Antonio, TX) . . . . .	1375
APC-dependent impairment of T cell proliferation in aging: role of CD28- and IL-12/IL-15-mediated signaling C. Tortorella, A. Pisconti, G. Piazzolla, S. Antonaci (Bari, Italy) . . .	1389
The influences on human longevity by HUMTHO1.STR polymorphism (Tyrosine Hydroxylase gene): A relative risk approach Q. Tan, D. Bellizzi, G. Rose, S. Garasto, C. Franceschi, T. Kruse, J.W. Vaupel, G. De Benedictis, A.I. Yashin (Odense, Denmark; Rende, Bologna, Italy; Rostock, Germany; Durham, NC). . . . .	1403
<b>Short communications</b>	
Caloric restriction restores the cardioprotective effect of preconditioning in the rat heart P. Long, Q. Nguyen, C. Thurow, T.L. Broderick (Glendale, AZ) . . .	1411
Establishing lymphoblastoid cell lines from frozen blood of extremely old individuals C. Lacelle, E. Wang (Montreal, Canada; Louisville, KY) . . . . .	1415
CTLA-4 upregulation during aging Q. Leng, Z. Bentwich, G. Borkow (Rehovot, Israel) . . . . .	1419

**Volume 123 No. 11****September 2002****Regular Articles**

The effect of aging on p38 signaling pathway activity in the mouse liver and in response to ROS generated by 3-nitropropionic acid C.-C. Hsieh, J. Papaconstantinou (Galveston, TX) . . . . .	1423
Oxidative, glycoxidative and lipoxidative damage to rat heart mitochondrial proteins is lower after 4 months of caloric restriction than in age-matched controls R. Pamplona, M. Portero-Otín, J. Requena, R. Gredilla, G. Barja (Madrid, Lleida, Spain; Bethesda, MD) . . . . .	1437
No reduction of energy metabolism in Clk mutants B.P. Braeckman, K. Houthoofd, K. Brys, I. Lenaerts, A. De Vreese, S. Van Eygen, H. Raes, J.R. Vanfleteren (Ghent, Belgium) . . . . .	1447
The mortality rate as a function of accumulated deficits in a frailty index A.B. Mitnitski, A.J. Mogilner, C. MacKnight, K. Rockwood (Halifax, Canada) . . . . .	1457
Lifespan in captive baboons is heritable L.J. Martin, M.C. Mahaney, A.M. Bronikowski, K. Dee Carey, B. Dyke, A.G. Comuzzie (San Antonio, TX; Cincinnati, OH; Ames, IA)	1461

Senescence-associated decline in hepatic peroxisomal enzyme activities corresponds with diminished levels of retinoid X receptor <i>alpha</i> , but not peroxisome proliferator-activated receptor <i>alpha</i> C. Chao, J. Youssef, M. Rezaiekhalegh, L.S. Birnbaum, M. Badr (Kansas City, MO; Research Triangle Park, NC) . . . . .	1469
Changes in peripheral blood lymphocyte subsets in elderly subjects are associated with an impaired function of the hypothalamic-pituitary-adrenal axis V. Martínez-Taboada, M.J. Bartolomé, J.A. Amado, R. Blanco, M.T. García-Unzueta, V. Rodríguez-Valverde, M. López-Hoyos (Santander, Spain) . . . . .	1477
Infrequent occurrence of age-dependent changes in CpG island methylation as detected by restriction landmark genome scanning J. Tra, T. Kondo, Q. Lu, R. Kuick, S. Hanash, B. Richardson (Ann Arbor, MI) . . . . .	1487
Mammary stem cell repertoire: new insights in aging epithelial populations G.H. Smith, C.A. Boulanger (Bethesda, MD) . . . . .	1505
Age-related changes in the induction of DNA polymerases in rat liver by $\gamma$ -ray irradiation T. Kaneko, S. Tahara, M. Tanno, T. Taguchi (Tokyo, Japan) . . . . .	1421

## Volume 123 No. 12

September 2002

### Preface

Mechanism of Aging and Development, Aging, Cancer and Functional Longevity: Special issue, Aging, Cancer and Functional Longevity S.C. Park (Seoul, South Korea) . . . . .	1529
---	------

### Special Issue Papers

Longevity determination genes in <i>Drosophila melanogaster</i> T. Aigaki, K.-h. Seong, T. Matsuo (Tokyo, Japan) . . . . .	1531
Mutation theory of aging, assessed in transgenic mice and knockout mice T. Ono, Y. Uehara, Y. Saito, H. Ikehata (Sendai, Japan) . . . . .	1543
A higher oxidative status accelerates senescence and aggravates age-dependent disorders in SAMP strains of mice M. Hosokawa (Kyoto, Japan) . . . . .	1553
Age-dependent agonist-specific dysregulation of membrane-mediated signal transduction: emergence of the gate theory of aging E.-J. Yeo, S.C. Park (Inchon, Seoul, South Korea) . . . . .	1563
Adaptive responses to oxidative damage in three mutants of <i>Caenorhabditis elegans</i> ( <i>age-1</i> , <i>mev-1</i> and <i>daf-16</i> ) that affect life span S. Yanase, K. Yasuda, N. Ishii (Kanagawa, Japan) . . . . .	1579

Modulation of redox-sensitive transcription factors by calorie restriction during aging H.J. Kim, K.J. Jung, B.P. Yu, C.G. Cho, J.S. Choi, H.Y. Chung (Busan, Pusan, South Korea; San Antonio, TX) . . . . .	1589
Dose effect of oxidative stress on signal transduction in aging S.-O. Yoon, C.-H. Yun, A.-S. Chung (Daejeon, South Korea) . . . . .	1597
Paradoxical increase of heat-shock response with age in a substrain of F344 rats: comparison between F344/DuCrj and F344/Jcl R. Takahashi, E. Toyoda, Y. Aoki, K.T. Suzuki, S. Goto (Chiba, Ibaraki, Japan) . . . . .	1605
A protein free diet uncovers the potential age-difference in the hepatic detoxifying system, glutathione <i>S</i> -transferase, in female mice M.-C. Carrillo, S. Kanai, K. Miyasaka, K. Kitani (Tokyo, Aichi, Japan; Rosario, Argentina) . . . . .	1617
Amyloid fibril proteins Y. Xing, K. Higuchi (Matsumoto, Japan) . . . . .	1625
The pathogenic mechanisms of prion diseases K. Hur, J.-I. Kim, S.-I. Choi, E.-K. Choi, R.I. Carp, Y.-S. Kim (Anyang, South Korea; New York, NY; Charlestown, MA) . . . . .	1637
DNA methylation in cancer and ageing Y. Yuasa (Tokyo, Japan) . . . . .	1649
Involvement of TNF- $\alpha$ changes in human cancer development, prevention and palliative care H. Fujiki, M. Suganuma, S. Okabe, M. Kurusu, K. Imai, K. Nakachi (Saitama, Hiroshima, Japan) . . . . .	1655
Spectrum of molecular changes during hepatocarcinogenesis induced by DEN and other chemicals in Fischer 344 male rats I.K. Lim (Suwon, South Korea) . . . . .	1665
Replicative senescence and senescence-like state induced in cancer-derived cells E.S. Hwang (Seoul, South Korea) . . . . .	1681
Contents of volume 123 . . . . .	1695
Author index . . . . .	1711
Subject index . . . . .	1715

